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Pinkeye of Cattle

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Pinkeye of cattle (infectious bovine keratoconjunctivitis) is a highly contagious disease that causes inflammation of the cornea and conjunctiva. It occurs most frequently in the early summer when there is a large number of susceptible calves. This is also the time of year with maximum sunlight (ultraviolet radiation) and maximum fly population.

Causative Agents and Occurrence

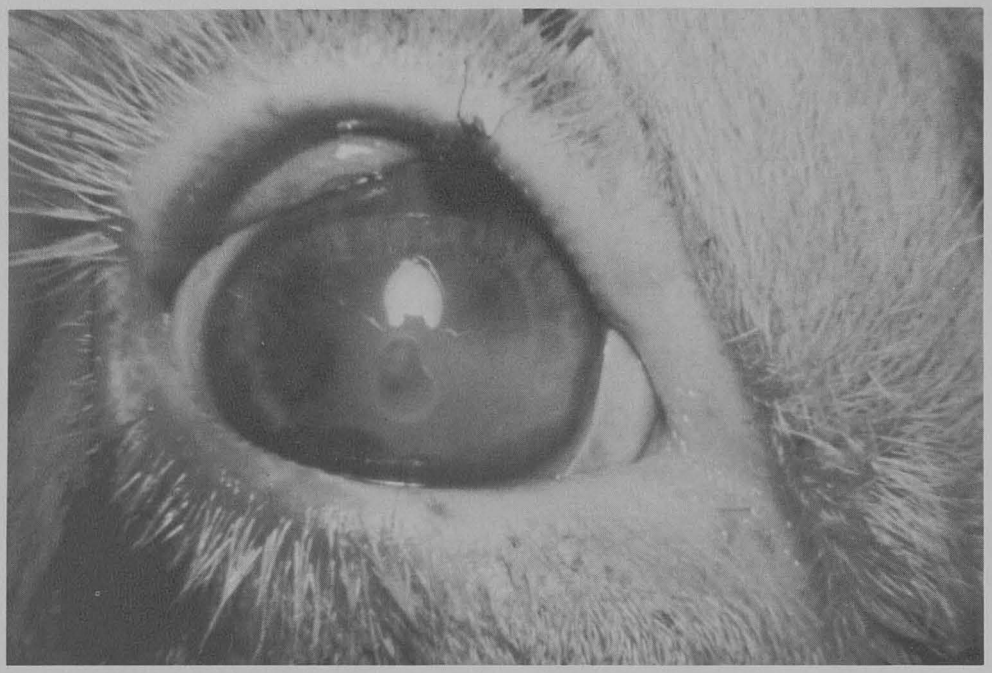
The bacteria *Moraxella bovis,* hemolytic strain, is the common infectious agent causing pinkeye. Infectious bovine rhinotracheitis (IBR) virus may cause similar lesions and may contribute along with *M. bovis* to cause a more severe inflammatory condition. Stress factors such as shipping, increased sunlight, eye irritants, and other viral or bacterial agents may play a role in increasing the severity of the disease.

Pinkeye occurs wherever cattle are raised and is most prevalent in the warmer months, but it can occur throughout the year. Only cattle are affected by *M. bovis* and young animals are most susceptible. The prevalence of pinkeye varies greatly from year to year.

Different breeds of cattle vary in their susceptibility to pinkeye. The disease is more prevalent, more severe, and causes greater production losses in British-bred cattle, which have less pigment around the eyes (e.g., Hereford, holstein, shorthorn). British-bred cattle with completely pigmented eyes (e.g., Angus) are less affected. Purebred humpbacked Zebu cattle (Brahma and others) apparently are not affected.

Transmission

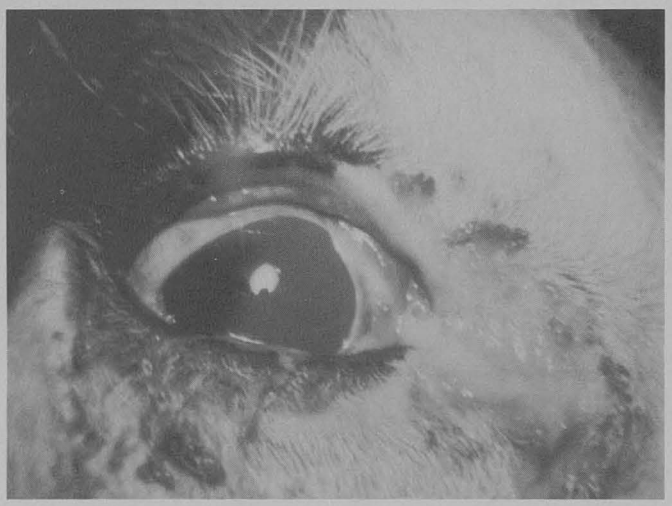
Infection can be transmitted by direct contact with ocular or nasal discharge of an infected animal. Flies such as the face fly, horn fly, stable fly, and house fly can spread infection as mechanical vectors. Contaminated equipment and people handling animals also can transmit the infection.

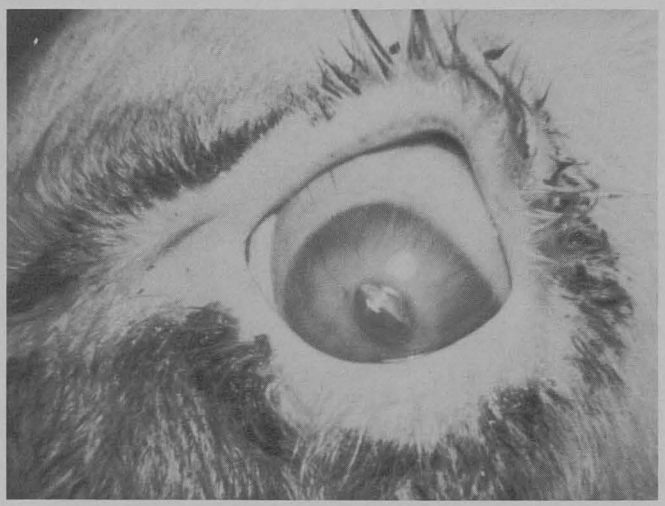


(Left) An infected eye in the early stage, showing cloudiness of the cornea with ulceration, conjunctivitis, and a clear ocular discharge. Note the fly on the upper lid.

(Bottom left) This infected eye is past the acute stage. It is still showing conjunctivitis, but with an accumulation of pus in the ocular discharge.

(Bottom right) Severely affected eye in the process of healing. The scar on the cornea is beginning to clear from the periphery.





Carrier State

All infected eyes do not develop clinical pinkeye. In many herds there are some animals showing no clinical signs that harbor *M. bovis* in the carrier state. These carriers are frequently a major source of infection. It has not been determined whether other species of animals could also be reservoirs of the bacteria.

Morbidity and Mortality

Up to 80 percent of the cattle in a herd may be affected. Usually cows have more resistance, resulting in a lower disease rate (50 percent or less). Their calves, which are more susceptible, may have a 100 percent disease rate. This does not mean, however, that all calves will develop pinkeye in both eyes.

The mortality rate of pinkeye is less than one percent. Severe cases that go untreated could progress to involvement of the optic nerve with subsequent encephalatis. Bilateral blindness in a young pastured animal could result in death from starvation.

Clinical Signs

The incubation period or time from infection to clinical disease is usually two to three days but may range up to 21 days. Initial signs are moist eyes and slight constriction of the pupil. Photophobia, or sensitivity to light, is demonstrated by the animal turning away from light, blinking, or keeping the eye closed. In a short time tears begin to overflow, there is distinct constriction of the pupil, and a haze on

the cornea, usually centrally. Then lacrimation becomes copious and a vesicle forms on the cornea which later ruptures and leaves a clear punched out ulcer. Opacity (cloudiness) of the cornea develops from the center and may make the complete cornea opaque by the fourth or fifth day. Enlarged blood vessels appear at the periphery of the cornea at seven to ten days and may completely encircle the cornea as the infection progresses. As the acute inflammation subsides, the ocular discharge may become more purulent. During the next 10 to 15 days the cornea begins to clear from the periphery toward the center. At the center of the cornea the blood vessels become devoid of blood and change to a white scar. The scar decreases in size from days 25 to 50. In less severe cases the lesions may heal without enlargement of blood vessels of the cornea. Spontaneous recovery may occur anytime in the course of the disease in mildly infected animals. The course of pinkeye can vary from one to six weeks.

Pathogenesis

The means by which the disease progresses is not completely understood. It has been suggested that the bacteria produce an endotoxin that causes tissue damage to the eye, resulting in the typical lesions of the disease.

Diagnosis

A diagnosis of pinkeye is based on lesions and clinical signs; i.e., conjunctivitis, photophobia, lacrimation, corneal ulcers and opacity, and impaired vision. The eye can be smeared with fluorescein (a dye) to help demonstrate pinpoint lesions and early corneal ulceration. *M. bovis* can be detected by fluorescent antibody techniques or bacterial culture and identification.

Differential diagnosis requires consideration of other diseases involving the eye. These include trauma, minor irritation, malignant catarrhal fever, mycoplasma, and IBR virus infection.

Treatment

Early in the course of the disease, treatment under both upper and lower eyelids with opthalmic solutions or ointments containing antibiotics may be beneficial. Antibacterial powders sprayed directly into the eye may cause irritation and discomfort to the animal and are not recommended. The animal may be placed in a dark shelter to decrease the effects of sunlight, or eye flap patches may be used to cover the eye so the animal can be turned outside.

In cases where there is extensive corneal inflammation, your veterinarian may prefer to treat using cortiscosteroid and antibiotic combinations injected directly under the conjunctiva. The antibiotic of choice should be determined by culture and sensitivity tests. Some animals recover following one injection, but severe cases may require several daily injections.

If there is severe ulceration, many veterinarians prefer to treat by suturing the third eyelid to cover the eye. The eye should remain covered for 7-10 days. Topical medication containing antibiotics, plus anesthetics and atropine to help relieve pain and minimize pupillary spasms, should be applied daily.

Consult with your veterinarian for diagnosis of eye infections in your cattle herd. If the infection is pinkeye, have culture and sensitivity tests performed to determine the most effective antibacterial agent to be used in treatment.

Prevention and Control

Insect Control

Eliminating or controlling the fly population tends to reduce the incidence of pinkeye, since flies are considered primary vectors in the transmission of the disease. Insecticides as dips and soaked flaps, or sprays over salt or mineral feeders may be effective in controlling the fly population. More recently insecticide ear tags have been used and have proven to be very effective. Use only approved chemicals and be sure to use them according to label directions.

Insecticide and phenothiazine feed additives also are used to kill fly larvae in cattle manure. Maximum benefit from this method is obtained when used on an area-wide basis rather than just on individual farms, since flies migrate from farm to farm.

Vaccination

Commercially produced bacterins are available for immunization against pinkeye. The commercial bacterins are not uniformly effective against all strains of *M. bovis*, however, so the effectiveness of vaccination against pinkeye varies considerably.

Cows should be vaccinated early in the spring in an attempt to eliminate the carrier stage prior to the fly season. If cases of pinkeye do occur, an autogenous bacterin can be produced from early cases and may provide more protection than commercial vaccines.

Bacterins require two to three injections at 10-14 day intervals to provide maximum protection against infection, so a program should be initiated about 40

days before the disease is expected to occur. For this reason, an autogenous bacterin prepared from early cases may not be as effective in providing protection the season it is prepared, but it may be effective the following season, providing the same strain of *M. bovis* is involved.

Evidence suggesting that vaccination may be beneficial includes the following:

- Vaccination has been shown to reduce the incidence of pinkeye.
- Research data indicate that the severity of lesions and clinical symptoms are reduced in vaccinated cattle.
- Evidence indicates that the duration of infection (carrier state) is reduced in vaccinated cattle.

Major problems related to the effectiveness of a vaccination program for pinkeye include:

- The reduction of clinical disease is not uniformly adequate in all vaccinated herds.
- There is a lack of cross protection between strains of *M. bovis,* thus reducing the potential effectiveness of vaccines.
- The immune response may develop slowly in some herds, reaching a maximum immunity as long as 28-45 days after vaccination.

Pasture Management

Exercise good pasture management. Do not pasture cattle where there is a heavy overgrowth of brush, thistle, and thorns, which are severe irritants to eyes and to thin skinned areas of cattle.

Summary

Pinkeye is an inflammatory infection of the eye that affects primarily the cornea and sclera. It is caused by the bacteria *Moraxella bovis.* The disease occurs most commonly in the summer, but it can be seen any time of the year.

Transmission

Infection can be transmitted by direct contact. Flies are considered a major factor in transmitting the disease. Some cattle may harbor the bacteria without showing clinical signs; these animals are carriers of the infection. Prevalence of the disease is variable.

Clinical Signs

Clinical signs include inflammation of the eye, progressing from excessive tearing to redness and swelling. Cloudiness and ulceration of the cornea may occur, along with inflammation of the conjunctiva.

Prognosis

Cases may result in spontaneous recovery, recovery after various treatments, blindness from permanent scarring of the complete cornea, or death in cases in which there is central nervous system involvement. Involvement of the central nervous system is extremely rare.

Treatment and Control

Various antibacterial treatments include topical or injectable antibiotics, occasionally used in combination with anti-inflammatory drugs. Suturing of the third eyelid over the cornea may aid in the healing of corneal ulcers. Patches over the eye protect the animal from sunlight irritation and decrease the rate of transmission.

Preventive measures include keeping infected animals apart from the herd, proper nutrition, fly control, and vaccination.

Consult with your veterinarian concerning a control program for pinkeye. Veterinarians are familiar with the problem as it occurs in your geographical area and can offer advice about the most effective means of control.

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